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Smart Solar Siting On Farmland

Achieving Climate Goals While Strengthening the Future for Farming in New York

March 3rd

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SAVING THE LAND THAT SUSTAINS US



PROTECT FARMLAND

We lose 2,000 acres of farmland a day across the US: this has serious implications for food production, our environment, and the next generation of farmers. In the time it takes to binge an episode of your latest show...we've lost another 64 acres.



PROMOTE SOUND FARMING PRACTICES

We help farmers with the difficult transition to more regenerative farming practices that rebuild soil health, sequester carbon, protect our waterways, and boost income.



KEEP FARMERS ON THE LAND

A seismic transfer of farmland is looming. More than 40% of American farmland is owned by seniors aged 65 and older. We provide the know-how, tools, and partnerships that connect current landowners with new farmers to ensure a sustainable farming future.



Acknowledgements

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Today's Agenda

- 1. The Need for Smart Solar Siting in New York
- 2. Survey Findings
- 3. Recommendations:
 - Smart Solar Siting Mitigation Framework
 - Other Recommendations for Governments, Developers, and Communities
 - Future Research and Partnerships
- 4. Next Steps
- 5. Questions

The Grid is Shifting to Renewables – Solar is Key

U.S. renewable electricity generation, including end use AEO2021 Reference case

billion kilowatthours



February 2022 IPCC 6th Assessment Report

The magnitude and rate of climate change and associated risks depend strongly on **near-term mitigation and adaptation actions**, and projected adverse impacts and related losses and damages **escalate with every increment** of global warming.



National Solar Growth Goals: from 4% to 45% by 2050

5 By 2050, utility scale solar could generate **~45%** of the country's power needs. >10 million acres 90% in rural communities 2010 2030 2050

National solar deployment land-use projections for the three core scenarios

Decarb



New York Law: on the Journey to 70% Renewables by 2030...



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Early Snapshot of Where Solar Installations Have Taken Place in New York

Good Quality Soil Poor Quality Soil Cropland 58% 23% **Developed** Areas 24% 19% Hav/Pasture 20% Wetlands **Forest** Medium Quality Soil 8% 29% 19%

"Agricultural land will likely remain the prime target for future utility scale solar development."

-Katkar et al., 2021

"Siting tends to be on prime farmland, because it's easiest to develop, [cheap and already cleared]."

-AFT Farmer Survey Respondent



NY Farmland Feeding New Yorkers

(¢ 5 North Country F **Finger Lakes** E R (**Central NY Capital Region** Western NY E ŝ In s Mohawk R 1 Southern Tier Long Island

Mid-Hudson

Top Agricultural Commodities by REDC Region



Icon size represents relative contribution to total state agricultural commodity production, measured by value of market sales per Economic Development Region

Analysis uses market revenue data from the USDA 2017 Census of Agriculture aggregated by REDC region.

NY Agriculture by the Numbers

See more: Schmit, Todd. "The Economic Contributions of Agriculture to the New York State Economy: 2019." Extension Bulletin. Cornell, August 2021. USDA NASS. "2017 Census of Agriculture - Volume 1, Chapter 1: State Level Data."

Food Security

163,000 jobs

\$44 billion

Climate Strategy

57,000+ farmers

33,000+ farms

9 million+ acres

Resilient Supply Chain



New York's Farmland



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Farms Under Threat

New York lost or fragmented 253,500 acres of farmland between 2001-2016, more than half was our best land for growing food and crops.

70% by 2030 target:

100,000 – 200,000+ acres needed for 21.6 GW of additional capacity from utility scale solar to get to 70x30

See more: Katkar et al. (2021)

Solar Development in Farm Communities is Uneven



New York's Farmland

Proposed Large Scale Solar Development, August 2021



Data Source: New York Independent System Operator, Inc. (NY15O) Interconnection Queue

Data Access Date: August 10, 2021



About AFT's Smart Solar Siting Project

Advisory Committee Engagement

Surveys distributed during Summer 2021
 407 farmers, 368 local government officials, 28 land trusts and environmental organizations

Roundtables

October 2021

2 stakeholder roundtables, 50 participants total
2 solar developer roundtables, 10 developers

Agency Engagement

November 2021-Present

- NYSERDA & NYSDAM
- Agricultural Technical Working Group
- Farmland Protection Working Group
- Office of Renewable Energy Siting



Smart Solar Project Advisory Committee





Cornell University Cooperative Extension



BLUEWAVE

















United States Department of Agriculture

Natural Resources Conservation Service



Survey Findings

Mixed Impact to Farm Viability Expected



-Survey Respondent



Farmer Responses Differed by Region



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Why Individual Farmers Want to Host Solar

Motivations for Farmers Currently Hosting Solar Projects Motivations for Farmers Interested in Hosting Solar in the Future



Expected Impact of Solar to the Farm

Currently Hosting

Reported and Expected Impacts Solar Projects Will Have on Farm Operations



Interested in Hosting

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"Large acreages taken out of production cause **stiff competition for land to maintain profitable operations**, someone is going out of business."

Community Level Impacts to Farm Economy

"Taking farmland out of production creates a trickle-down effect. **All the other businesses lose business.** For example, it takes a minimum of \$200 an acre for crop support per acre. This includes seed and fertilizer sales, fuel, equipment repairs and payments on new equipment, tires, sprays, twine and bale wrap, dairy supplies, fencing the list goes on and on."

"Economic Benefits are not well distributed."

Who Owns the Land? Impacts to Farmer-Renters

Of those who rent farmland, over half (51%) reported a negative impact from solar.



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Who Owns the Land? Impacts to Farmer-Renters by REDC Region



In the Mohawk Valley and Central NY, **over** 25% of farmers reported that land to rent was becoming scarcer.

Between 16-22% of farmers in all regions except the Southern Tier and Mid-Hudson reported that land is becoming more expensive to rent due to solar.

In the Mohawk Valley and North Country, ~15% of farmers reported losing access to land they used to rent.



"[The] town of Lansing is being targeted for a tremendous amount of solar primarily on viable, highly productive farmland due to existing infrastructure that is no longer utilized by a coal generation plant. **Our farm alone stands to lose 300-400 acres which makes nutrient management interesting**."

> - Farmer in Tompkins County, Southern Tier

Dairy: Mixed Impacts

Dairy farmers more frequently reported:

- **Being contacted** by a solar developer.
- Negative impacts to renting from solar
- Losing access to land they used to rent

"Being a dairy farm, there is a limit to how big a circle we can profitably haul feed and manure in. **Every acre that is lost makes us haul farther, increasing our cost."**



Where Farmers Host Solar Now and Future Preferences

Currently Hosting Projects



Where would you host solar?



Not all Farmland is Created Equal





Data Source: New York Independent System Operator, Inc. (NYISO) Interconnection Queue

Data Access Date: August 10, 2021



Understanding NY Farmland Classification

Percent of Mineral Soils Groups in each Farmland Class (statewide)

| Farmland Class | Mineral Soil Groups | | | | | | | | | |
|---------------------------|---------------------|------|------|------------------------|-----|------|----|----|---|----|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| | | | | | | | | | | |
| Prime farmland | | 90 | 5% | | 3% | 0.1% | - | - | - | - |
| Farmland of statewide | | | | | | | | | | |
| importance | - | - | 4% | | 94 | % | | 2% | - | - |
| | | | | | | | | | | |
| Not prime farmland | - | - | 0.1% | 0.2% 5% 95% 0.2 | | 0.2% | | | | |
| | | | | | • | | | | | |
| Prime farmland if drained | - | 0.3% | 0.1% | | 99% | | 1% | - | - | - |

"**Not all farmland is created equal**. Farms are businesses and need to generate as much income as possible from all acres in order to be viable. Working with solar developers to focus on developing unproductive farmland is a win for the farmer-community-environment]."



Farmer's Preferred Locations for Solar

"The sun shines just as brightly on crummy land for farming as it does on our best." - Survey Respondent



Farmers' Interest in Mitigating Impacts



"We are in contract for a 46-acre utility solar project on our farm. We are also planning to graze sheep to raise for market on those same 46 acres. Win-Win!"

-Farmer in Niagara County, Western NY



What stood out to you from AFT's findings today?





Recommendations

What is Smart Solar Siting?

With smart solar siting we can accelerate the expansion of renewable energy generation and cut greenhouse gas emissions while maintaining our natural and working lands.



Protect Best Farmland Ensure Farm Viability Benefit Farmers



Proposed Smart Solar Mitigation Framework

Part 1: Classify solar projects based on soil quality

Part 2: Apply fee discounts for activities that keep land in farming and support farm viability

Part 3: Implementation and verification of activities

Part One: Classify Solar Projects Based on Soil Quality

| Category | Initial Project Classification | Fee |
|----------|---|---|
| Orange | Project facility area includes 25% or more actively farmed MSG 1-4 ; and > 30 acres MSG 1-4 | Per acre fee of 150% of cost of protecting farmland within impacted REDC region applied to project MSG 1-4 acres |
| Yellow | Project facility area includes 10- 25% actively farmed MSG 1-4 ; and > 30 acres MSG 1-4 | Per acre fee of 100% of cost of protecting farmland within impacted REDC region applied to project MSG 1-4 acres |
| Green | Project facility area includes less than 10% actively farmed MSG 1-4 | No mitigation fee |

*Actively farmed land defined as agricultural land that has been farmed at least one of the last five years

Avoidance = Mitigation Cost Savings



Large Scale Project Example, Orange (50 MWac)

| NYS Farmland Protection Comp: \$2,500/acre | Current Mitigation | New Mitigation Proposal |
|--|------------------------------|--------------------------------------|
| Project Facility Area (LOD) | 375 acres (7.5ac/MW) | 375 Acres |
| MSG 1-4 Impacted (>25%) | 150 acres | 150 acres (40% of LOD) |
| Categorization | - | Orange |
| Average cost of NYSDAM farmland protection award (indexed to REDC) | - | \$2,500/acre (eg Central NY) |
| Mitigation Fee | \$1,000/acre (est.) | \$3,750/acre (\$2,500 x 150%) |
| Total Project Mitigation Fee | \$150,000 (\$3,000/MW) | \$562,500 (3.75x) |



Large Scale Project Example, Yellow (50 MWac)

| NYS Farmland Protection Comp: \$2,500/acre | Current Mitigation | New Mitigation Proposal |
|--|---------------------------|------------------------------|
| Project Facility Area (LOD) | 375 acres (7.5 ac/MW) | 375 Acres |
| MSG 1-4 Impacted (10-25%) | 75 acres | 75 acres (20% of LOD) |
| Categorization | - | Yellow |
| Average cost of NYSDAM farmland protection award (indexed to REDC) | _ | \$2,500/acre (eg Central NY) |
| Mitigation Fee | \$1,000/acre (est.) | \$2,500/acre (100%) |
| Total Project Mitigation Fee | \$75,000 | \$187,500 (2.5x) |

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Comparison of Mitigation Outcomes 50 MW / 375 acre Hypothetical

| | Current NYSERDA | AFT Framework | Reference |
|-----------------------------|---|-------------------------------|--------------------------------------|
| NYISO _A (Orange) | \$150,000 | \$562,500 (3.75x) | 150 ac x \$3750/ac >25% MSG 1-4 |
| NYISO _B (Yellow) | \$75,000 | \$187,500 (2.5x) | 75 ac x \$2,500/ac 10-25% MSG 1-4 |
| NYISO (Green) | \$0 (only if < 30 ac MSG 1-4) | \$0 (if < 10% MSG 1-4) | |



Part Two: Fee Discounts for Activities that Keep Land in Farming and Support Farm Viability

| Adjuster | Fee Discount | Implementation |
|---|---|--|
| Supports Farm Viability and Intergenerational Transfer | e.g., 10% | Submission of Letter of Attestation and Farm Business and/or Transition plan proving solar is key to success |
| Incorporates Agrivoltaics | No fee collected on acres used for agrivoltaics | Project designed with farmer for crop production, continued farm activity annually verified |
| Incorporates Co-Utilization | e.g., 10-15% | Project consults farmer to design plan, continued farm activity annually verified |
| Managed for Soil Health | e.g., 5-10% | Project consults with Soil and Water Conservation District or other expert (NRCS) to design plan, continued management annually verified |
| Managed for Pollinator Habitat | e.g., 5% | Project meets state standards for pollinator performance and includes apiary |

Discounts can be combined and stacked



Part 3: Implementation & Verification

Farm Viability and Intergenerational Transfer

- Letter of Attestation (current land use and quality)
- Farm business or transition plan
- NYSDAM review
- Discount commensurate with difficulty of plan implementation
 - Consider cap

Agrivoltaics, Co-utilization, Soil Health, and Pollinator Discounts

- Project location and design determined with farmer/SWCD/expert
- Annual verification of continued production; penalty for discontinuation

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• Research participation and collection of baseline soil samples

Comparison of Mitigation Discounts 50 MW / 375 acre Hypothetical

| | Current NYSERDA | AFT Framework | 35% Discount (combined) |
|-----------------------------|---|-------------------------------|----------------------------|
| NYISO _A (Orange) | \$150,000 | \$562,500 → \$365,625 | - \$196,875 |
| NYISO _B (Yellow) | \$75,000 | \$187,500 → \$121,875 | - \$65,625 |
| NYISO (Green) | \$0 (only if < 30 ac MSG 1-4) | \$0 (if < 10% MSG 1-4) | |



Recommended Use of Mitigation Funds



Majority invested in permanent farmland protection with tracking and transparency and

tracking and transparency and keeping funds local (Host Communities or County)

Priorities beyond farmland protection should be determined locally (County IDA, farmland protection board)





Additional Smart Solar Siting Recommendations

Minimizing Cumulative Impacts

NJ Solar Development Threshold

- No more than 2.5% of Prime Farmland in Agricultural Development Areas (ADAs) can be developed with solar
- Waiver up to 5% hard cap

- Track and analyze cumulative impacts of solar development
- Explore implementing at state or local level in New York
- Investment in additional research to develop best pathways, such as mitigation fee escalators



Mitigating Impacts to Farmer-Renters

- 1. Developers should work with farmers and landowners to minimize farmer-renter displacement
- 2. Farmers may wish to consider rental contracts over handshake deals
- 3. Payment for loss of crop production for fixed time period or until land is found
- 4. Fund farmer consultation with land access experts



Actions Governments Can Take to Reduce Solar Pressure on Farmland

- Incentivize, streamline, and accelerate approvals for siting on rooftops, disturbed areas, and marginal lands
- Prioritize new transmission to areas that have high concentrations of marginal farmland
- Continue to advance energy efficiency in buildings



Increasing Federal, State, and Local Investments to Advance Farmland Protection and Smart Solar Siting

- Increase investment in Farmland Protection and farmland protection planning both locally and at the state level
- Facilitate land transition and access, including with Farmland for a New Generation
- Pass Community Preservation Act legislation
- Invest in research on best practices for construction and decommissioning and applied research on agrivoltaics in New York
- With proof of concept, implement market incentivizes for agrivoltaic projects

New York State Agency Actions to Achieve Smart Solar Siting



- Ensure best practices are always followed
- Collect data on farmer-renter displacement
- Minimize or eliminate incentives when farmer-renters are displaced
- Improve farmland protection program administration
- Partner with stakeholders to collect and aggregate data on agrivoltaics

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• Support local planning processes

How Developers Can Help Achieve Smart Solar Siting

- Work with landowners and communities to protect farmland and support farm viability
- Advance energy storage
- Conduct and share baseline soil health data for land in solar
- Ensure decommissioning bonds are sufficient to restore farmland



Recommendations for Future Research



Of these recommendations, what do you think are the greatest opportunities to advance smart solar siting in the work that you do?



AFT Next Steps and Future Engagement

- Support solar developers in advancing farmland protection and farm viability in their scoping, design, planning, and engagement processes
- Work findings and recommendations into ATWG and FPWG work
- Encourage NYS Agencies to adopt proposed mitigation framework
- Accelerate research on Dual Use and Agrivoltaics
- Engage with the NY Legislature on solar and farmland issues

Thank You!



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Questions?



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https://farmlandinfo.org/publications/ smart-solar-siting-in-new-york-report/



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